

TRANSMITTAL LETTER TO THE UNITED STATES  
DESIGNATED/ELECTED OFFICE (DO/EO/US)  
CONCERNING A FILING UNDER 35 U.S.C. 371

International Application. No. PCT/FR99/01347	International Filing Date June 8, 1999	Priority Date Claimed June 11, 1998
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**Title of Invention:** Cosmetic Composition Comprising at Least a Tacky Polymer and at Least a Fixing Polymer

**Applicants For DO/EO/US:** Isabelle ROLLAT-CORVOL; Henri SAMAIN

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1.  This is a FIRST submission of items concerning a filing under 35 U.S.C. 371.
2.  This is a SECOND or SUBSEQUENT submission of items concerning a filing under 35 U.S.C. 371.
3.  This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
4.  A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5.  A copy of the International Application as filed (35 U.S.C. 371(c)(2))
  - a.  is transmitted herewith (required only if not transmitted by the International Bureau).
  - b.  has been transmitted by the International Bureau.
  - c.  is not required, as the application was filed in the United States Receiving Office (RO/US).
- A translation of the International Application into English (35 U.S.C. 371(c)(2)).
- Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3)).
  - a.  are transmitted herewith (required only if not transmitted by the International Bureau).
  - b.  have been transmitted by the International Bureau.
  - c.  have not been made; however, the time limit for making such amendments has NOT expired.
  - d.  have not been made and will not be made.
- A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
- An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
- A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

**Items 11. to 16. below concern other document(s) or information included:**

11.  An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12.  An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13.  A FIRST preliminary amendment.
- A SECOND or SUBSEQUENT preliminary amendment.
14.  A substitute specification.
15.  A change of power of attorney and/or address letter.
16.  Other items or information:
  - a.  Copy of Cover Sheet of International Publication No. WO99/63955.
  - b.  Copy of Notification of Missing Requirements.

17. [X] The following fees are submitted:	CALCULATIONS
Basic National Fee (37 CFR 1.492(a)(1)-(5)):	
Search Report has been prepared by the EPO or JPO.....\$860.00	
International preliminary examination fee paid to	
- USPTO (37 CFR 1.482).....\$690.00	
No international preliminary examination fee paid to	
USPTO (37 CFR 1.482) but international search fee	
paid to USPTO (37 CFR 1.445(a)(2)).....\$760.00	
Neither international preliminary examination fee	
(37 CFR 1.482) nor international search fee	
(37 CFR 1.445(a)(2)) paid to USPTO.....\$1,000.00	
International preliminary examination fee paid to USPTO	
(37 CFR 1.482) and all claims satisfied provisions	
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<b>ENTER APPROPRIATE BASIC FEE AMOUNT</b>	<b>= \$860.00</b>

Surcharge of \$130.00 for furnishing the oath or declaration later than  
 20  30 months from the earliest claimed priority date  
 (37 CFR 1.492(e)).

Claims	Number Filed	Number Extra	Rate	\$
Total Claims	37-20=	17	X \$18.00	\$306.00
Independent Claims	1 - 3=	0	X \$80.00	\$
Multiple dependent claim(s) (if applicable)			+\$270.00	\$
			<b>TOTAL OF ABOVE CALCULATIONS</b>	<b>= \$1166.00</b>

Reduction by 1/2 for filing by small entity, if applicable.

<b>SUBTOTAL</b>	<b>= \$1166.00</b>
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Processing fee of \$130.00 for furnishing the English translation later than  
 20  30 months from the earliest claimed priority date  
 (37 CFR 1.492(f)).

<b>TOTAL NATIONAL FEE</b>	<b>= \$1166.00</b>
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Fee for recording the enclosed assignment (37 CFR 1.21(h)). The  
 assignment must be accompanied by an appropriate cover sheet  
 (37 CFR 3.28, 3.31).

\$40.00 per property	+	\$
		<b>TOTAL FEES ENCLOSED</b>

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a. [X] A check in the amount of \$ 1166.00 to cover the above fees is enclosed.

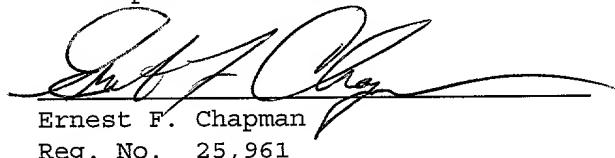
b. [ ] Please charge my Deposit Account No. \_\_\_\_\_ in the amount of

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c. [X] The Commissioner is hereby authorized to charge any additional fees  
 which may be required, or credit any overpayment to Deposit Account  
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The Commissioner is hereby authorized to charge any other fees due under 37 C.F.R. §1.16  
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COSMETIC COMPOSITION COMPRISING AT LEAST ONE TACKY POLYMER  
AND AT LEAST ONE FIXING POLYMER

The subject of the invention is a cosmetic

5 composition for keratinous fibres such as the hair comprising, in a cosmetically acceptable medium, at least one tacky polymer having a glass transition temperature of less than 20°C and at least one fixing polymer having a glass transition temperature greater than 15°C. It also  
10 relates to a method of treating keratinous fibres such as hair, in particular a method of fixing and/or maintaining hairstyle, using the said composition as well as the use of this composition in or for making a cosmetic hairstyling formulation.

15 For the purposes of the present invention, the expression "keratinous fibres" is understood to mean the hair, the eyelashes and the eyebrows and the expression "tacky polymer" a polymer which, after application by pressing onto an identical polymer, resists an attempt at  
20 separation.

The fixing of the hairstyle is an important component of hairstyling which consists in maintaining the shape already made or in shaping the hair and in fixing it simultaneously. The expression "fixing polymer" is  
25 understood to mean a polymer which maintains the shape of

the hair or which makes it possible to shape the hair and to fix it simultaneously.

The hair products for shaping and/or maintaining the hairstyle which are most common on the cosmetics market are compositions to be sprayed, essentially consisting of a solution, most often an alcohol or aqueous solution, and one or more materials, generally polymeric resins, whose function is to form bonds between the hair, also called fixing materials, in the form of a mixture with various cosmetic adjuvants. This solution is generally packaged either in an appropriate aerosol container pressurized with the aid of a propellant, or in a pump dispenser.

Hairstyling gels or foams are also known which are generally applied to wet hair before blow-drying or hair setting. Unlike conventional aerosol lacquers, these compositions have the disadvantage of not allowing the fixing of hair in a shape which already exists. Indeed, these compositions are essentially aqueous and their application wets the hair and cannot therefore maintain the initial shape of the hairstyle. To shape and fix the hairstyle, it is therefore necessary to then carry out blow-drying or drying.

Most of the compositions of the state of the art have the same disadvantage of not fixing or maintaining

the hairstyle for a sufficiently long period. Thus, the shape initially given to the hairstyle gradually disappears during the day, this in fact happening more quickly if the person is moving about. Consequently, it is often necessary to repeat all the hairstyling and fixing operations if it is desired to recover the initial hairstyle.

Hairstyling compositions are therefore being sought which offer a sufficiently strong fixing and maintaining effect for the hairstyle to suitably withstand the various stresses over time.

Finally, the compositions intended for fixing the hairstyle sometimes have the disadvantage of impairing the cosmetic properties of the hair. Thus, the hair may become rough, difficult to disentangle, lose its pleasant feel and appearance. Hairstyling compositions are therefore being sought which offer good cosmetic properties, in particular in terms of disentanglement, softness and feel.

A need therefore exists to find cosmetic compositions, in particular for hairstyling, which do not have the set of disadvantages indicated above.

Surprisingly and unexpectedly, the Applicant has discovered that when tacky polymers, in particular branched sulphonic polyesters or (meth)acrylic ester

polymers, are combined with certain fixing polymers, it is possible to obtain cosmetic compositions which meet the requirements expressed above.

The subject of the invention is therefore a  
5 cosmetic composition for keratinous fibres such as the hair comprising, in a cosmetically acceptable medium, at least one tacky polymer having a glass transition temperature (Tg) of less than 20°C and at least one fixing polymer having a glass transition temperature (Tg) greater  
10 than 15°C.

Advantageously, a tacky polymer is chosen which has a peeling profile defined by at least one maximum peeling force  $F_{max} > 3$  Newton, and preferably greater than 5 N.

15 More advantageously still, the peeling profile is defined, in addition, by an energy for separation  $E_{s(M/V)}$  of the material brought into contact with a glass surface of less than 300  $\mu J$ , when the glass transition temperature of the tacky polymer is less than -15°C.

20 The maximum peeling force  $F_{max}$  is the maximum tensile force, measured with the aid of an extensometer, necessary to peel apart the respective 38  $mm^2$  surfaces of two rigid, inert and nonabsorbent supports (A) and (B) placed opposite each other; the said surfaces being  
25 previously coated with the tacky polymer previously

dissolved at 5% in an aqueous, aqueous-alcoholic or alcoholic solvent, at the rate of  $1 \text{ mg/mm}^2$ , dried for 24 hours at  $22^\circ\text{C}$  under a relative humidity of 50%, then subjected for 20 seconds to a compression of 3 Newton and 5 finally subjected for 30 seconds to pulling at the rate of 20 mm/min.

Advantageously, supports (A) and (B) consisting of polyethylene, polypropylene, metal alloy or glass are used.

10 The separation energy  $E_{s(M/V)}$  is the energy provided by the extensometer in order to carry out the separation of the respective  $38 \text{ mm}^2$  surfaces of two rigid, inert and nonabsorbent supports (C) and (D) placed opposite each other; one of the said supports consisting 15 of cut glass and the other of the said supports being of an identical nature to the supports (A) and (B) as defined in Claim 4 or 5 and whose surface is previously coated with the tacky polymer previously dissolved at 5% in an aqueous, aqueous-alcoholic or alcoholic solvent, at the 20 rate of  $1 \text{ mg/mm}^2$ , dried for 24 hours at  $22^\circ\text{C}$  under a relative humidity of 50%, the two surfaces of the said supports (C) and (D) being subjected for 20 seconds to a compression of 3 Newton and finally subjected for 30 seconds to pulling at the rate of 20 mm/min.

The separation energy  $E_{s(M/V)}$  is work which can be calculated by means of the following formula:

$$\int_{x_{s1}+0.05}^{x_{s2}} F(x)dx$$

where  $F(x)$  is the force necessary to produce a  
5 movement ( $x$ );

$x_{s1}$  is the movement (expressed in millimetres) produced by the maximum tensile force;

$x_{s2}$  is the movement (expressed in millimetres) produced by the tensile force which allows the complete separation of  
10 the two surfaces of the supports (C) and (D).

Preferably, a tacky polymer will be chosen such that the maximum peeling force  $F_{max}$  is greater than 5 Newton and/or such that its glass transition temperature (Tg) is less than 20°C. If the Tg of the polymer is less  
15 than -15°C, it will preferably need to have in addition a separation energy  $E_{s(M/V)}$  of less than 300 µJ.

The relative concentration by weight of tacky polymer in the composition is in general greater than 0.01%, more preferably greater than 0.1%, and more  
20 preferably still greater than 0.5%.

According to a first advantageous embodiment of the present invention, a branched sulphonic polymer or (meth)acrylic ester polymers are chosen as tacky polymer.

Advantageously, a fixing polymer is chosen which  
25 has a glass transition temperature (Tg) greater than 25°C.

In accordance with the invention, the relative concentration by weight of fixing polymer in the composition is in general greater than 0.01%, and preferably greater than 0.1%.

- 5           A particularly preferred form of the branched sulphonic polyester is that obtained by polymerization of:
- (i) at least one difunctional dicarboxylic acid not carrying a sulphonic function;
  - (ii) at least one difunctional monomer carrying at least one sulphonic function, the functional group(s) being chosen from the group comprising hydroxyl, carboxyl and amino groups;
  - (iii) at least one diol or a mixture of diol(s) and of diamine(s);
  - 10          (iv) optionally one difunctional monomer chosen from the group comprising hydroxycarboxylic acids, aminocarboxylic acids and mixtures thereof;
  - 15          (v) at least one multifunctional reagent carrying at least three functional groups chosen from the group comprising amino, alcohol and carboxylic acid groups.

20          Such a polymerization may be carried out starting with:

- (i) at least one difunctional dicarboxylic acid not carrying a sulphonic function;

- (ii) 2 to 15 relative mol% of difunctional monomer carrying at least one sulphonic function;
- (iii) at least one diol or a mixture of diol(s) and of diamine(s);
- 5 (iv) 0 to 40 relative mol% of the difunctional monomer chosen from the group comprising the hydroxycarboxylic acids, the aminocarboxylic acids and mixtures thereof;
- (v) 0.1 to 40 relative mol% of the multifunctional reagent carrying at least three reactive functional groups.

10 The branched sulphonic polymers preferably contain substantially equal proportions, as number of equivalents, of carboxylic acid functions, on the one hand, and of diol and/or diol and diamine functions, on the other hand.

15 The difunctional dicarboxylic acid (i) is preferably chosen from the group comprising aliphatic dicarboxylic acids, alicyclic dicarboxylic acids, aromatic dicarboxylic acids or a mixture thereof and more particularly from the group comprising 1,4-cyclohexanedioic acid, succinic acid, glutaric acid, adipic acid, azelaic acid, sebacic acid, fumaric acid, maleic acid, 1,3-cyclohexanedioic acid, phthalic acid,

terephthalic acid and isophthalic acid or mixtures thereof.

The difunctional monomer (ii) as defined above is preferably chosen from the group comprising 5 dicarboxylic acids, dicarboxylic acid esters, glycols and hydroxy acids each containing at least one metal sulphonate group.

The diol (iii) is preferably chosen from the group comprising alkanediols and polyalkylenediols and 10 more particularly from the group comprising ethylene glycol, propylene glycol, diethylene glycol, triethylene glycol and polypropylene glycol.

The diamine (iii) may be chosen from the group comprising alkanediamines and polyalkylenediamines.

15 The multifunctional reagent (v) is preferably chosen from the group comprising trimethylolethane, trimethylolpropane, glycerol, pentaerythritol, sorbitol, trimellitic anhydride, erythritol, threitol, dipentaerythritol, pyromellitic dianhydride and 20 dimethylpropionic acid.

The branched sulphonic polymers more particularly desired by the present invention are those described in patent applications WO 95/18191, WO 97/08261 and WO 97/20899.

In accordance with the invention, there is advantageously chosen, as branched sulphonic polymer, the polymer AQ 1350 marketed by the company Eastman. This polymer AQ 1350 is defined by:

- 5 - a glass transition temperature, given by the  
supplier, equal to 0°C;  
- a maximum peeling force  $F_{max}$  equal to 25 N.

According to a second advantageous embodiment of the compositions in accordance with the invention, a (meth)acrylic ester polymer is used as tacky polymer.

The tacky (meth)acrylic ester polymers used in accordance with the invention advantageously comprise:

- (a) from 9 to 99% by weight of a (meth)acrylic ester monomer relative to the total weight of the polymer;

15                   (b) up to 90% of comonomer(s);

                     (c) from 1 to 10% of a vinylidene monomer containing a carboxyl or hydroxyl group.

The (meth)acrylic ester monomer (a) generally corresponds to the formula (I) or (II):



in which R represents a C<sub>1</sub> to C<sub>18</sub> alkyl, an alkoxy(C<sub>2</sub> to C<sub>8</sub>) alkyl, an alkylthio(C<sub>2</sub> to C<sub>8</sub>) alkyl or a C<sub>2</sub> to C<sub>8</sub> cyanoalkyl. By way of example, the monomer (a) may be chosen from the group comprising methyl acrylate, ethyl

acrylate, n-butyl acrylate, isobutyl acrylate, hexyl acrylate, octyl acrylate, 2-ethylhexyl acrylate, decyl acrylate, methoxyacrylate, ethoxyacrylate, methylthiomethyl acrylate and cyanopropyl acrylate.

- 5           The comonomer (b) may contain one or more vinylidene groups having terminal CH<sub>2</sub>=C groups, such as:
- acrylic or methacrylic esters, such as methyl methacrylate, ethyl methacrylate, n-butyl methacrylate, methyl ethacrylate,
  - vinyl halides such as vinyl chloride;
  - vinyl and allyl esters such as vinyl acetate, vinyl butyrate, vinyl chloroacetate;
  - aromatic vinyls such as styrene, vinyltoluene, chloromethylstyrene, vinylnaphthalene; and
  - vinyl nitriles such as acrylonitrile or methacrylonitrile.
- 10
- 15

Among the vinylidene monomers containing hydroxyl groups (c), there may be mentioned acrylate monomers containing a terminal hydroxyl group, such as

20   hydroxyethyl acrylate, hydroxyethyl methacrylate, hydroxypropyl acrylate, hydroxyethyl methacrylate, hydroxybutyl acrylate or alternatively certain hydroxymethylated derivatives of diacetone acrylamide, for example N-methylolacrylamide, N-methylolmaleamide,

N-propanolacrylamide, N-methylolmethacrylamide,  
N-methylol-p-vinylbenzamide.

Among the vinylidene monomers containing carboxyl groups (c), there may be mentioned for example  
5 acrylic or methacrylic acid, itaconic acid, citraconic acid, maleic acid.

The tacky (meth)acrylic ester polymers particularly desired by the present invention are those described in patents US 5 234 627 and US 4 007 147.

10 In accordance with the invention, the polymer Hycar 26 120 marketed by the company Goodrich is advantageously chosen as (meth)acrylic ester polymers. This polymer Hycar 26 120 is defined by:

- 15 - a glass transition temperature, given by the supplier, equal to -10°C;  
- a maximum peeling force  $F_{max}$  equal to 6.25 N.

The fixing polymer is generally chosen from anionic, cationic, amphoteric and nonionic fixing polymers and mixtures thereof.

20 These fixing polymers may be used in solubilized form or alternatively in the form of a dispersion of solid particles of polymer.

As cationic fixing polymer, there is preferably chosen the polymers comprising primary, secondary, 25 tertiary and/or quaternary amine groups which are part of

the polymer chain or which are directly attached to it, and having a molecular weight of between 500 and about 5,000,000 and preferably between 1000 and 3,000,000.

- As anionic fixing polymers, there are preferred
- 5 the polymers comprising groups derived from a carboxylic, sulphonic or phosphoric acid and which have a weight-average molecular weight of between about 500 and 5,000,000.

- As amphoteric fixing polymers, there are
- 10 preferably chosen the polymers comprising B and C units randomly distributed in the polymer chain, where B denotes a unit derived from a monomer comprising at least one basic function, in particular a basic nitrogen atom and C denotes a unit derived from an acidic monomer comprising
- 15 one or more carboxylic or sulphonic groups or alternatively B and C may denote groups derived from zwitterionic monomers of carboxybetaines or sulphobetaines; B and C may also denote a cationic polymer chain comprising primary, secondary, tertiary or
- 20 quaternary amine groups, in which at least one of the amine groups carries a carboxylic or sulphonic group attached via a hydrocarbon radical; or alternatively B and C are part of a chain of a polymer containing an ethylene- $\alpha,\beta$ -dicarboxylic unit of which one of the carboxylic

groups has been caused to react with a polyamine comprising one or more primary or secondary amine groups.

As nonionic fixing polymers, polyurethanes are advantageously chosen.

5 Among the fixing polymers used in solubilized form, the polymers chosen from the group comprising silicone-containing acrylic polymers, polymers based on a vinylpyrrolidone and vinylcaprolactam monomer will be preferably used.

10 Among the fixing polymers which exist in the form of a dispersion, those comprising acrylic or methacrylic monomers and esters thereof or alternatively those comprising styrene monomers will be preferably used.

The composition may be provided in vaporizable, 15 foam, gel or lotion form and the cosmetically acceptable vehicle may consist of an appropriate solvent to which additives such as gelling agents or foaming agents are added. In general, the solvent is chosen from water, alcohols or an aqueous-alcoholic mixture.

20 The compositions may contain, in addition, an appropriate quantity of propellants such as customary compressed or liquefied gases, preferably compressed air, carbon dioxide or nitrogen, or alternatively a gas which is soluble or otherwise in the composition, such as

dimethyl ether, hydrocarbons which are fluorinated or otherwise and mixtures thereof.

The subject of the invention is also an aerosol device consisting of a container containing an aerosol composition consisting, on the one hand, of a liquid phase (or juice) containing at least one composition in accordance with the invention in an appropriate solvent and a propellant as well as a means of distributing the said aerosol composition.

10 Yet another subject of the invention is a method of treating keratinous fibres, in particular hair, characterized in that the composition in accordance with the invention is applied to the said fibres before or after shaping the hairstyle.

15 The composition in accordance with the invention is generally used in or for making a cosmetic hairstyling formulation.

The examples below make it possible to illustrate the invention without however seeking to limit 20 the scope thereof. The polymers indicated below will be used:

Amphomer	Octylacrylamide/acrylate/butyl-aminoethyl/methacrylate copolymer marketed by National Starch
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Polymer LO-21 DRY      Polydimethyl/methyl siloxane  
containing methyl 3-propylthio-  
acrylate/methyl methacrylate/  
methacrylic acid groups marketed  
by 3M

Luviskol VA64P      Polyvinylpyrrolidone marketed by  
BASF

Uramul SC 132      Acrylic copolymer latex marketed  
by DMS RESINS; Tg = 50°C

AQ 1350      Branched sulphonic polyester  
marketed by the company Eastman

EXAMPLES:

Compositions in accordance with the invention  
comprising a combination of a branched sulphonic polymer  
5 and a fixing polymer are compared below with compositions  
in accordance with the prior art containing either the  
branched sulphonic polymer alone, or the fixing polymer  
alone.

Example 1 (comparative) :

Sensory tests are carried out in order to compare the performance of compositions in accordance with the invention and of compositions in accordance with the prior art. The comparison is made on the retention of the hairstyle over time and under a constraint.

For that, 3 compositions in accordance with the invention and 4 compositions in accordance with the prior art are made. These compositions are applied to wigs of natural hair. Next, the shape retention of the wig and the return of the shape of the wigs after shaking are evaluated.

## Composition 1 (invention):

AQ 1350	4 g
Amphomer	2 g
Water	75 g
2-Amino-2-methyl-1-propanol qs	0.37 g
neutralization Amphomer	
Alcohol qs	100 g

## Composition 2 (invention):

AQ 1350	4 g
Polymer LO-21 DRY previously 90%	2 g

neutralized

Water		75 g
Alcohol	qs	100 g

Composition 3 (invention):

AQ 1350		4 g
LUVISKOL VA 64 P		2 g
Water		75 g
Alcohol	qs	100 g

Composition 4 (prior art - branched sulphonic polyester alone):

AQ 1350		6 g
Water		75 g
Alcohol	qs	100 g

Composition 5 (prior art - fixing polymer alone):

Amphomer		6 g
Water		75 g
2-Amino-2-methyl-1-propanol	qs	1.09 g

neutralization Amphomer

Alcohol	qs	100 g
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Composition 6 (prior art - fixing polymer alone):

Polymer LO-21 DRY previously 90%	6 g
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neutralized

Water	75 g
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Alcohol	qs	100 g
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Composition 7 (prior art - fixing polymer alone):

LUVISKOL VA 64 P	6 g
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Water	75 g
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Alcohol	qs	100 g
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Each of the compositions is introduced into a pump dispenser. 3 grams of each composition are sprayed onto a wig of hair 20 cm long previously shampooed and drained. It is allowed to dry for 4 hours and the wig is turned over.

The wig is shaken by means of an alternating rotation for 2 hours. The final shape of the locks is compared with the shape which they had before shaking and

the shape retention is estimated. A score from 0 to 5 is used:

- 0 indicates a very poor shape retention and a completely collapsed hairstyle,
- 5 - 5 indicates an excellent retention and a hairstyle which has remained intact and voluminous in spite of the shaking.

The wigs are then disentangled and they are again shaken for 20 seconds. The return of the shape of 10 the hairstyle when it has been subjected to all these operations is estimated. The same score scale ranging from 0 to 5 is used.

Table 1 summarizes the results.

Table 1

Composition	Shape retention after shaking	Return of the shape after shaking and disentanglement
1	3.25	2.5
2	4.0	4.0
3	4.5	4.25
4	2.0	4.0
5	3.75	0.75
6	3.5	1.0
7	2.0	0.75

without treatment	0	0.5
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Table 1 shows that the compositions in accordance with the invention and comprising the combination of polymers offer better results in terms of shape retention after shaking and of a return of the shape after shaking and disentanglement than the compositions in accordance with the prior art.

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Example 2:

A composition 8 in accordance with the invention is prepared and the retention of the hairstyle as well as certain cosmetic properties are estimated.

15

Composition 8 (invention):

AQ 1350	4 g
URAMUL SC 132	0.5 g
Water            qs	100 g

A wig of 20 g of natural hair is taken and 2.5 grams of composition 8 are applied to the hair and allowed to dry.

It is observed that the hair is maintained very well. Disentanglement is easy and the locks have a good feel after disentanglement.

CLAIMS

1. Cosmetic composition for keratinous fibres such as the hair: characterized in that it  
5 comprises, in a cosmetically acceptable medium, at least one tacky polymer having a glass transition temperature (Tg) of less than 20°C and at least one fixing polymer having a glass transition temperature (Tg) greater than 15°C.

10 2. Composition according to Claim 1, characterized in that the tacky polymer has a peeling profile defined by at least one maximum peeling force  $F_{max} > 3$  Newton, and preferably greater than 5 N.

15 3. Composition according to Claim 2, characterized in that when the glass transition temperature of the tacky polymer is less than -15°C, the peeling profile is defined, in addition, by an energy for separation  $E_{s(M/V)}$  of the material brought into contact with a glass surface of less than 300  $\mu J$ .

20 4. Composition according to Claim 2, characterized in that  $F_{max}$  is the maximum tensile force, measured with the aid of an extensometer, necessary to peel apart the respective 38  $mm^2$  surfaces of two rigid, inert and nonabsorbent supports (A) and (B) placed 25 opposite each other; the said surfaces being previously

coated with the tacky polymer previously dissolved at 5% in an aqueous, aqueous-alcoholic or alcoholic solvent, at the rate of 1 mg/mm<sup>2</sup>, dried for 24 hours at 22°C under a relative humidity of 50%, then subjected for 20 seconds to  
5 a compression of 3 Newton and finally subjected for 30 seconds to pulling at the rate of 20 mm/min.

5. Composition according to Claim 4,  
characterized in that the supports (A) and (B) consist of polyethylene, polypropylene, metal alloy or glass.

10 6. Composition according to Claim 2,  
characterized in that  $E_{s(M/V)}$  is the energy provided by the extensometer in order to carry out the separation of the respective 38 mm<sup>2</sup> surfaces of two rigid, inert and nonabsorbent supports (C) and (D) placed opposite each  
15 other; one of the said supports consisting of cut glass and the other of the said supports being of an identical nature to the supports (A) and (B) as defined in Claim 4 or 5 and whose surface is previously coated with the tacky polymer previously dissolved at 5% in an aqueous, aqueous-alcoholic or alcoholic solvent, at the rate of 1 mg/mm<sup>2</sup>,  
20 dried for 24 hours at 22°C under a relative humidity of 50%, the two surfaces of the said supports (C) and (D) being subjected for 20 seconds to a compression of 3 Newton and finally subjected for 30 seconds to pulling at  
25 the rate of 20 mm/min.

7. Composition according to Claim 6,  
characterized in that  $E_{s(M/V)}$  is the work calculated by  
means of the following formula:

$$\int_{x_{s1}+0.05}^{x_{s2}} F(x)dx$$

5 where  $F(x)$  is the force necessary to produce a  
movement ( $x$ );

$x_{s1}$  is the movement (expressed in millimetres)  
produced by the maximum tensile force;

$x_{s2}$  is the movement (expressed in millimetres)  
10 produced by the tensile force which allows the complete  
separation of the two surfaces of the supports (C) and  
(D).

8. Composition according to any one of  
the preceding claims, characterized in that the tacky  
15 polymer is a branched sulphonic polyester or (meth)acrylic  
ester polymers.

9. Composition according to any one of  
the preceding claims, characterized in that the relative  
concentration by weight of tacky polymer in the  
20 composition is greater than 0.01%, preferably greater than  
0.1%, and more preferably still greater than 0.5%.

10. Composition according to any one of  
the preceding claims, characterized in that the fixing  
polymer has a glass transition temperature (Tg) greater  
25 than 25°C.

11. Composition according to any one of the preceding claims, characterized in that the relative concentration by weight of fixing polymer in the composition is greater than 0.01%, and preferably greater than 0.1%.

12. Composition according to Claim 8, characterized in that the branched sulphonic polyester is formed by polymerization of:

- (i) at least one difunctional dicarboxylic acid not carrying a sulphonic function;
- 10 (ii) at least one difunctional monomer carrying at least one sulphonic function, the functional group(s) being chosen from the group comprising hydroxyl, carboxyl and amino groups;
- 15 (iii) at least one diol or a mixture of diol(s) and of diamine(s);
- 20 (iv) optionally one difunctional monomer chosen from the group comprising hydroxycarboxylic acids, aminocarboxylic acids and mixtures thereof;
- (v) at least one multifunctional reagent carrying at least three functional groups chosen from the group comprising amino, alcohol and carboxylic acid groups.

13. Composition according to Claim 12,  
characterized in that the polymerization is carried out  
starting with:

- (i) at least one difunctional  
5 dicarboxylic acid not carrying a sulphonic function;
- (ii) 2 to 15 relative mol% of  
difunctional monomer carrying at least one sulphonic  
function;
- (iii) at least one diol or a mixture  
10 of diol(s) and of diamine(s);
- (iv) 0 to 40 relative mol% of the  
difunctional monomer chosen from the group comprising  
the hydroxycarboxylic acids, the aminocarboxylic  
acids and mixtures thereof;
- 15 (v) 0.1 to 40 relative mol% of the  
multifunctional reagent carrying at least three  
reactive functional groups.

14. Composition according to either of  
Claims 12 and 13, characterized in that the branched  
20 sulphonic polymer contains substantially equal  
proportions, as number of equivalents, of carboxylic acid  
functions, on the one hand, and of diol and/or diol and  
diamine functions, on the other hand.

15. Composition according to any one of  
25 Claims 12 to 14, characterized in that the difunctional

dicarboxylic acid (i) is chosen from the group comprising aliphatic dicarboxylic acids, alicyclic dicarboxylic acids and aromatic dicarboxylic acids.

16. Composition according to Claim 15,  
5 characterized in that the difunctional dicarboxylic acid (i) is chosen from the group comprising 1,4-cyclohexanedioic acid, succinic acid, glutaric acid, adipic acid, azelaic acid, sebacic acid, fumaric acid, maleic acid, 1,3-cyclohexanedioic acid, phthalic acid,  
10 terephthalic acid and isophthalic acid and a mixture thereof.

17. Composition according to any one of Claims 12 to 14, characterized in that the difunctional monomer (ii) is chosen from the group comprising  
15 dicarboxylic acids, dicarboxylic acid esters, glycols and hydroxy acids each containing at least one metal sulphonate group.

18. Composition according to any one of Claims 12 to 14, characterized in that the diol (iii) is  
20 chosen from the group comprising alkanediols and polyalkylene diols.

19. Composition according to Claim 18,  
characterized in that the diol (iii) is chosen from the group comprising ethylene glycol, propylene glycol,

diethylene glycol, triethylene glycol and polypropylene glycol.

20. Composition according to any one of Claims 12 to 14, characterized in that the diamine (iii) 5 is chosen from the group comprising alkanediamines and polyalkylenediamines.

21. Composition according to any one of Claims 12 to 14, characterized in that the multifunctional reagent (v) is chosen from the group comprising 10 trimethylolethane, trimethylolpropane, glycerol, pentaerythritol, sorbitol, trimellitic anhydride, erythritol, threitol, dipentaerythritol, pyromellitic dianhydride and dimethylpropionic acid.

22. Composition according to Claim 8, 15 characterized in that the (meth)acrylic ester polymer advantageously comprises:

- (a) from 9 to 99% by weight of a (meth)acrylic ester monomer relative to the total weight of the polymer;
- 20 (b) up to 90% of comonomer;
- (c) from 1 to 10% of a vinylidene monomer containing a carboxyl or hydroxyl group.

23. Composition according to any one of the preceding claims, characterized in that the fixing

polymer is chosen from the anionic, cationic, amphoteric and nonionic fixing polymers and mixtures thereof.

24. Composition according to Claim 23,  
characterized in that the fixing polymers are provided in  
5 solubilized form or in the form of a dispersion of solid  
particles of polymer.

25. Composition according to Claim 24,  
characterized in that the cationic fixing polymers are  
chosen from the polymers comprising primary, secondary,  
10 tertiary and/or quaternary amine groups which are part of  
the polymer chain or which are directly attached to it,  
and having a molecular weight of between 500 and about  
5,000,000 and preferably between 1000 and 3,000,000.

26. Composition according to Claim 23,  
15 characterized in that the anionic fixing polymers are  
polymers comprising groups derived from a carboxylic,  
sulphonic or phosphoric acid and which have a weight-  
average molecular weight of between about 500 and  
5,000,000.

20 27. Composition according to Claim 23,  
characterized in that the fixing polymers are amphoteric  
polymers chosen from the polymers comprising B and C units  
randomly distributed in the polymer chain, where B denotes  
a unit derived from a monomer comprising at least one  
25 basic function, in particular a basic nitrogen atom and C

denotes a unit derived from an acidic monomer comprising one or more carboxylic or sulphonic groups or alternatively B and C may denote groups derived from zwitterionic monomers of carboxybetaines or

5 sulphobetaines; B and C may also denote a cationic polymer chain comprising primary, secondary, tertiary or quaternary amine groups, in which at least one of the amine groups carries a carboxylic or sulphonic group attached via a hydrocarbon radical; or alternatively B and

10 C are part of a chain of a polymer containing an ethylene- $\alpha,\beta$ -dicarboxylic unit of which one of the carboxylic groups has been caused to react with a polyamine comprising one or more primary or secondary amine groups.

28. Composition according to Claim 23,  
15 characterized in that the nonionic fixing polymers are polyurethanes.

29. Composition according to Claim 1,  
characterized in that the fixing polymer is a water-soluble polymer chosen from the group comprising silicone-  
20 containing acrylic polymers, polymers based on a vinylpyrrolidone and vinylcaprolactam monomer.

30. Composition according to Claim 1,  
characterized in that the fixing polymer is a dispersed polymer based on acrylic or methacrylic monomers and  
25 esters thereof and a polymer based on styrene monomers.

31. Composition according to any one of the preceding claims, characterized in that it is provided in the form of a vaporizable composition, a foam, a gel or a lotion.

5 32. Composition according to any one of the preceding claims, characterized in that the cosmetically acceptable vehicle consists of an appropriate solvent, to which additives such as gelling agents or foaming agents may be added.

10 33. Composition according to any one of the preceding claims, characterized in that it comprises a solvent chosen from water, an alcohol or an aqueous-alcoholic mixture.

15 34. Composition according to any one of the preceding claims, characterized in that it comprises, in addition, an appropriate quantity of propellant consisting of customary compressed or liquefied gases, preferably compressed air, carbon dioxide or nitrogen, or alternatively a gas which is soluble or otherwise in the  
20 composition, such as dimethyl ether, hydrocarbons which are fluorinated or otherwise and mixtures thereof.

35. Aerosol device consisting of a container containing an aerosol composition consisting, on the one hand, of a liquid phase (or juice) containing at  
25 least one composition in accordance with any one of Claims

1 to 30 in an appropriate solvent and a propellant as well as a means of distributing the said aerosol composition.

36. Method of treating keratinous fibres, in particular hair, characterized in that the composition 5 as defined in Claims 1 to 30 is applied to the said fibres before or after shaping the hairstyle.

37. Use of a composition according to any one of Claims 1 to 30 in or for making a cosmetic hairstyling formulation.

**Declaration and Power of Attorney for Patent Application****Déclaration et Pouvoir pour Demand de Brevet****French Language Declaration**

En tant que l'inventeur nommé ci-après, je déclare par le présent acte que:

Mon domicile, mon adresse postale et ma nationalité sont ceux figurant ci-dessous à côté de mon nom.

Je crois être le premier inventeur original et unique (si un seul nom est mentionné ci-dessous), ou l'un des premiers co-inventeurs originaux (si plusieurs noms sont mentionnés ci-dessous) de l'objet revendiqué, pour lequel une demande de brevet a été déposée concernant l'invention intitulée

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

**COSMETIC COMPOSITION COMPRISING AT LEAST A TACKY POLYMER AND AT LEAST A FIXING POLYMER**

the specification of which is attached hereto unless the following box is checked:

- was filed on June 8, 1999 as United States Application Number or PCT International Application Number PCT/FR99/01347 and was amended on \_\_\_\_\_ (if applicable).

et dont la description est fournie ci-joint à moins que la case suivante n'ait été cochée:

a été déposée le \_\_\_\_ ==  
sous le numéro de demande des Etats-Unis ou le  
numéro de demande international PCT  
\_\_\_\_\_ et modifiée  
\_\_\_\_\_ (les cas échéant).

Je déclare par le présent acte avoir passé en revue et compris le contenu de la description ci-dessus, revendications comprises, telles que modifiées par toute modification dont il aura été fait référence ci-dessus.

Je reconnais devoir divulguer toute information pertinente à la brevetabilité, comme défini dans le Titre 37, § 1.56 du Code fédéral des réglementations.

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, § 1.56.

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Attorney Docket No.: 05725.0807

**French Language Declaration**

Je revendique par le présent acte avoir la priorité étrangère, en vertu du Titre 35, § 119(a)-(d) ou § 365(b) du Code des Etats-Unis, sur toute demande étrangère de brevet ou certificat d'inventeur ou, en vertu du Titre 35, § 365(a) du même Code, sur toute demande internationale PCT désignant au moins un pays autre que les Etats-Unis et figurant ci-dessous et, en cochant la case, j'ai aussi indiqué ci-dessous toute demande étrangère de brevet, tout certificat d'inventeur ou toute demande internationale PCT ayant une date de dépôt précédant celle de la demande à propos de laquelle une priorité est revendiquée.

Prior foreign application(s)  
Demande(s) de brevet antérieure(s)

98/07376 (Number) (Numéro)	France (Country) (Pays)
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 (Number) (Numéro)	 (Country) (Pays)
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Je revendique par le présent acte tout bénéfice, en vertu du Titre 35, § 119(e) du Code des Etats-Unis, de toute demande de brevet provisoire effectuée aux Etats-Unis et figurant ci-dessous.

 (Application No.)  (N° de demande)	 (Filing Date)  (Date de dépôt)
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 (Application No.)  (N° de demande)	 (Filing Date)  (Date de dépôt)
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Je revendique par le présent acte tout bénéfice, en vertu du Titre 35, § 120 du Code des Etats-Unis, de toute demande de brevet effectuée aux Etats-Unis, ou en vertu du Titre 35, § 365(c) du même Code, de toute demande internationale PCT désignant les Etats-Unis et figurant ci-dessous et, dans la mesure où l'objet de chacune des revendications de cette demande de brevet n'est pas divulgué dans la demande antérieure américaine ou internationale PCT, en vertu des dispositions du premier paragraphe du Titre 35, § 112 du Code des Etats-Unis, je reconnais devoir divulguer toute information pertinente à la brevetabilité, comme défini dans le Titre 37, § 1.56 du Code fédéral des réglementations, dont laquelle est devenue disponible entre la date de dépôt de la demande antérieure, et la date de dépôt de la demande nationale ou internationale PCT de la présente demande:

 (Application No.)  (N° de demande)	 (Filing Date)  (Date de dépôt)
--	--

 (Application No.)  (N° de demande)	 (Filing Date)  (Date de dépôt)
--	--

Je déclare par le présent acte que toute déclaration ci-incluse est, à ma connaissance, véridique et que toute déclaration formulée à partir de renseignements ou de suppositions est tenue pour véridique; et de plus, que toutes ces déclarations ont été formulées en sachant que toute fausse déclaration volontaire ou son équivalent est passible d'une amende ou d'une incarcération, ou des deux, en vertu de la Section 1001 du Titre 18 du Code des Etats-Unis, et que de telles déclarations volontairement fausses risquent de compromettre la validité de la demande de brevet ou du brevet délivré à partir de celle-ci.

I hereby claim foreign priority under Title 35, United States Code, § 119(a)-(d) or § 365(b) of any foreign application(s) for patent or inventor's certificate, or § 365(a) of any PCT International Application which designated at least one country other than the United States, listed below, and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or PCT International application having a filing date before that of the application on which priority is claimed.

Priority Not Claimed  
Droit de priorité non revendiqué

June 11, 1998  
(Day/Month/Year Filed)  
(Jour/Mois/Anné de dépôt)



(Day/Month/Year Filed)  
(Jour/Mois/Anné de dépôt)

I hereby claim the benefit under Title 35, United States Code, § 119(e) of any United States provisional application(s) listed below.

I hereby claim the benefit under Title 35, United States Code, § 120 of any United States application(s), or § 365(c) of any PCT International Application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International Application in the manner provided by the first paragraph of Title 35, United States Code, § 112, I acknowledge the duty to disclose any or all information which is material to patentability as defined in Title 37, Code of Federal Regulations, § 1.56 which became available between the filing date of the prior application and the national or PCT International filing date of this application.

(Status) (patented, pending, abandoned)  
(Status) (breveté, en cours d'examen, abandonné)

(Status) (patented, pending, abandoned)  
(Status) (breveté, en cours d'examen, abandonné)

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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Attorney Docket No.: 05725.0807

### French Language Declaration

**POUVOIRS:** En tant que l'inventeur cité, je désigne par la présente l'(les) avocat(s) et/ou agent(s) suivant(s) pour qu'ils poursuive(nt) la procédure de cette demande de brevet et traite(nt) toute affaire s'y rapportant avec L'Office des brevets et des marques: (*mentionner le nom et le numéro d'enregistrement*).

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**POWER OF ATTORNEY:** As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this patent application and transact all business in the Patent and Trademark Office connected therewith: (*list name and registration number*):

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Attorney Docket No.: 05725.0807

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Signature d'inventeur	Date	Third Inventor's signature	
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